



## **Tropical Atlantic model error and regional projections of climate change**

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Current state-of-the-art models exhibit large climatological errors in the tropical Atlantic. The consequence of these errors for climate projections is undocumented. Here we compare climate change projections with a standard and an anomaly coupled configurations of the Norwegian Climate Prediction Model (NorCPM). Anomaly coupling greatly reduces the simulated climatological errors. This leads to greatly differing climate change projections (present to 2100). The standard model shows a rather uniform warming of around 2.5 degrees Celsius over the equatorial Atlantic. In contrast, the corrected model shows greater warming in the east, reaching 3 degrees Celsius in the eastern equatorial Atlantic. These changes are reflected in quite different rainfall response patterns. The standard model shows that climate change will lead to wetter conditions over central Africa and the western Atlantic, and drier conditions over eastern equatorial South America and the south equatorial Atlantic. The corrected model, in contrast, shows greater rainfall changes in the east and over central Africa, and less drying over South America. The underlying mechanisms causing these differences will be discussed. This result illustrates the potential impact of mean state errors in future climate change in this region.